

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of the claims in the application.

Listing of Claims:

1        1. (Currently Amended) A power amplifier module  
2        comprising:  
3        an amplifier; and  
4        a control circuit that supplies the amplifier with an  
5        idling current that controls the output power of the  
6        amplifier,  
7        wherein the control circuit receives an input control  
8        voltage and is constructed such that the idling current is  
9        defined as an exponential function of the input control  
10      voltage.

1        2. (Previously Presented) The power amplifier module  
2        according to claim 1, wherein the control circuit includes:  
3        a circuit that converts the input control voltage into  
4        current;  
5        a circuit that generates a reference voltage from the  
6        current into which the input control voltage has been

7 converted and sets a gradient of voltage that changes in  
8 proportion to the input control voltage; and  
9 a circuit that converts the voltage into current that  
10 changes exponentially relative to the input control  
11 voltage.

1 3. (Previously Presented) The power amplifier module  
2 according to claim 1, wherein the amplifier is a complex  
3 comprising a plurality of stages of amplifiers connected in  
4 tandem, and wherein the control circuit is a complex  
5 comprising a plurality of circuits that receive the control  
6 input voltage in common and supply respective idling  
7 currents behaving as aforesaid to the plurality of stages  
8 of amplifiers.

1 4. (Previously Presented) The power amplifier module  
2 according to claim 3, wherein a common circuit is formed,  
3 comprising a circuit that converts the input control  
4 voltage into current, a circuit that generates a reference  
5 voltage from the current into which the input control  
6 voltage has been converted and sets a gradient of voltage  
7 that changes in proportion to the input control voltage,  
8 and a circuit that converts the voltage into current that

9 changes exponentially relative to the input control  
10 voltage, and

11 wherein a plurality of circuits connected to said  
12 common circuit supply the respective idling currents to the  
13 plurality of stages of amplifiers based on the current that  
14 changes exponentially relative to the input control  
15 voltage.

1 5. (Previously Presented) A power amplifier module  
2 comprising:

3 an amplifier; and  
4 a control circuit that supplies the amplifier with an  
5 idling current that controls the output power of the  
6 amplifier;

7 wherein the control circuit receives an input control  
8 voltage and makes the idling current behave so as to  
9 exponentially change, relative to the input control  
10 voltage,

11 wherein the amplifier is fabricated with GaAsHBTs  
12 packaged on a semiconductor integrated circuit including a  
13 pair of an input transistor and an output transistor, the  
14 input transistor carrying the idling current and forming a

15 current mirror circuit in conjunction with the output  
16 transistor, and

17 wherein the control circuit is fabricated with Si  
18 transistors or GaAsHBTs packaged on a semiconductor  
19 integrated circuit.

1 6. (Previously Presented) A power amplifier module  
2 comprising:

3 an amplifier; and  
4 a control circuit that supplies the amplifier with an  
5 idling current that controls the output power of the  
6 amplifier,

7 wherein the control circuit receives an input control  
8 voltage and makes the idling current behave so as to  
9 exponentially change, relative to the input control  
10 voltage,

11 wherein the amplifier is fabricated with SiGeHBTs or  
12 Si bipolar transistors packaged on a semiconductor  
13 integrated circuit including a pair of an input transistor  
14 and an output transistor, the input transistor carrying the  
15 idling current and forming a current mirror circuit in  
16 conjunction with the output transistor, and

17 wherein the control circuit is fabricated with  
18 SiGeHBTs or Si bipolar transistors packaged on a  
19 semiconductor integrated circuit.

1 7. (Previously Presented) The power amplifier module  
2 according to claim 1,

3 wherein the power amplifier module further includes a  
4 circuit that limits the idling current once the input  
5 control voltage has reached a predetermined level.

1 8. (Previously Presented) The power amplifier module  
2 according to claim 1,

3 wherein the power amplifier module further includes a  
4 circuit by which a temperature characteristic of the idling  
5 current can be set optionally.

1 9. (Previously Presented) The power amplifier module  
2 according to claim 2,

3 wherein the amplifier is a complex comprising a  
4 plurality of stages of amplifiers connected in tandem, and  
5 wherein the control circuit is a complex comprising a  
6 plurality of circuits that receive the control input  
7 voltage in common and supply respective idling currents

8 behaving as aforesaid to the plurality of stages of  
9 amplifiers.

1 10. (Previously Presented) The power amplifier module  
2 according to claim 9, wherein a common circuit is formed,  
3 comprising the circuit that converts the input control  
4 voltage into current, the circuit that generates a  
5 reference voltage from the current into which the input  
6 control voltage has been converted and sets a gradient of  
7 voltage that changes in proportion to the input control  
8 voltage, and the circuit that converts the voltage into the  
9 current that changes exponentially relative to the input  
10 control voltage,

11 wherein a plurality of circuits connected to said  
12 common circuit supply the respective idling currents to the  
13 plurality of stages of amplifiers based on the current that  
14 changes exponentially relative to the input control  
15 voltage.

1 11. (Original) The power amplifier module according  
2 to claim 2, wherein the amplifier is fabricated with  
3 GaAsHBTs packaged on a semiconductor integrated circuit  
4 including a pair of an input transistor and an output

5 transistor, the input transistor carrying the idling  
6 current and forming a current mirror circuit in conjunction  
7 with the output transistor, and  
8 wherein the control circuit is fabricated with Si  
9 transistors or GaAsHBTs packaged on a semiconductor  
10 integrated circuit.

12. (Original) The power amplifier module according  
2 to claim 2, wherein the amplifier is fabricated with  
3 SiGeHBTs or Si bipolar transistors packaged on a  
4 semiconductor integrated circuit including a pair of an  
5 input transistor and an output transistor, the input  
6 transistor carrying the idling current and forming a  
7 current mirror circuit in conjunction with the output  
8 transistor, and  
9 wherein the control circuit is fabricated with  
10 SiGeHBTs or Si bipolar transistors packaged on a  
11 semiconductor integrated circuit.

13. (Previously Presented) The power amplifier module  
2 according to claim 3, wherein the power amplifier module  
3 further includes a circuit that limits the idling current

4 once the input control voltage has reached a predetermined  
5 level.

1 14. (Original) The power amplifier module according  
2 to claim 2, wherein the power amplifier module further  
3 includes a circuit by which the temperature characteristic  
4 of the idling current can be set optionally.

1 15. (Previously Presented) The power amplifier module  
2 according to claim 5,  
3 wherein the control circuit includes:  
4 a circuit that converts the input control voltage into  
5 current;  
6 a circuit that generates a reference voltage from the  
7 current into which the input control voltage has been  
8 converted and sets a gradient of voltage that changes in  
9 proportion to the input control voltage; and  
10 a circuit that converts the voltage into the idling  
11 current that changes exponentially.

1 16. (Previously Presented) The power amplifier module  
2 according to claim 6,  
3 wherein the control circuit includes:

4        a circuit that converts the input control voltage into  
5    current;  
6        a circuit that generates a reference voltage from the  
7    current into which the input control voltage has been  
8    converted and sets a gradient of voltage that changes in  
9    proportion to the input control voltage; and  
10      a circuit that converts the voltage into the idling  
11    current that changes exponentially.

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